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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,110	08/18/2003	Jeffrey F. Roeder	ATMI-605	3324

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EXAMINER

EVERHART, CARIDAD

ART UNIT PAPER NUMBER

2891

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/643,110	Applicant(s) ROEDER ET AL.	
	Examiner Caridad M. Everhart	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32-36,38-40,42,44,46-48 and 50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 32-36,38-40,42,44,46-48 and 50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

The indicated allowability of claims 33 and 34 and 35 is withdrawn in view of the newly discovered reference(s) to Shapiro et al (US 5,603,988). Rejections based on the newly cited reference(s) follow.

Claim Objections

Claim 46 is objected to because of the following informalities: ^{claim 46} depends upon cancelled claim 45. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 32-36,38-40,42,44, and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Shapiro et al .

Shapiro et al discloses a metalorganic precursor which satisfies the formula in the claims(col. 2, lines 60-67). In the formula 2 in col. 2, line 67, the X may be a halogen (col. 3, line 9). The metal may be Ti or Ta(col. 3, line 1). The subscripts x and y can be 1-4, and v, w, and z can be 1-4(col. 3,lines 2-5). Claim 40 is satisfied by the disclosure that the precursor can be a mixture of compounds(col. 2, lines 30-35) and

Art Unit: 2891

that among the compounds can be the compound in col. 4, lines 22-24 which is a silicon source.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 2891

Claim 42, is rejected under 35 U.S.C. 103(a) as being unpatentable over Shapiro et al as applied to claim 32 above, and further in view of Kirlin et al (US 6,320,213B1) and further in view of Su(US 4,783,430).

Shapiro et al is silent with respect to an aluminum component.

Kirlin et al discloses that titanium aluminum nitride is a desirable barrier layer which can be prepared with metalorganic precursors(col. 4, lines 57-65 and col. 5, lines 1-5).

Su discloses the formation of aluminum nitride barrier using alkylalanes(col. 2, lines 39-42).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the disclosures of Shapiro et al with that of Kirlin et al and of Su because the mixed barrier layer is useful as a barrier, and the precursors taught by Shapiro et al and by Su are useful in the allowing of low temperature deposition of the barrier layer.

Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shapiro et al as applied to claim 32 above, and further in view of Vaartstra et al (US 6,445,023B1).

Shapiro et al is silent with respect to boron in the composition.

Vaartstra et al discloses a boron source for a mixed nitride in a metalorganic deposition in which the boron source is diborane(col. 3, lines 40-57).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the combination of the source taught by Shapiro et al because

Art Unit: 2891

Vaarstra et al teaches that this produces a useful barrier and because diborane is a source of boron which is conventional in the art.

Claims 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shapiro et al as applied to claim 32 above, and further in view of Bhandari et al (US 6,379,748B1).

Shapiro et al is silent with respect to an additional silicon source.

Bhandari et al discloses that a TiSiN or TaSiN barrier is useful (col. 2, lines 37-40).

Muroyama, et al disclose a precursor with formula (I) in which M is Si and in which R1 and R2 are the same methyl or other alkyl and X is F (col. 4, lines 10-20; col. 5, lines 30-56), and b is 2. It can be seen that ethyl is included in the disclosure that R is an alkyl group, as ethyl is an alkyl group.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, B. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2891

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Everhart
10-12-2005


CARIDAD EVERHART
PRIMARY EXAMINER